any one of several alternative methods, subject to engineering and cost studies, which should be included in the feasibility studies.

a. Ground water development using tube wells.

b. A second storage reservoir on the Arghandab River above the present reservoir, to store excess run-off and spill.

c. A diversion from the Helmand water supply.

C. SPECIAL PROBLEMS

The great concern of the HAVA in connection with land development is in the low rate of completion of the required feasibility studies and the delays which have hindered progress on the ACU Equipment Loan. Since both of these subjects have been discussed in SECTION I, they will not be elaborated upon here.

D. COSTS

As a result of a detailed study the Bureau of Reclamation estimates the cost of constructing laterals, drains, roads and land leveling at $200 per acre, including a 25% add-on for engineering and overhead. Fertility restoration and soil amendment, which would be required in most areas, would add up to $100 per acre additional. With that as a basis, total estimated costs for completing land development on the 300,000 acres under water command, and providing the supplemental water needed in the Arghandab area, would be as follows. About 70% of these costs would require hard currency and the balance would be in local currency.

1.	Marja and Nad-i-Ali rescue operation	$ 2,000,000
2.	130,000 acres to be totally developed at $300 per acre	39,000,000
3.	130,000 acres requiring primarily rehabilitation and land preparation at $100 per acre	13,000,000
4.	Seraj canal rehabilitation	1,500,000
5.	Arghandab supplemental water development	8,000,000
	Total	$63,500,000

SECTION III

AGRICULTURE AND RURAL DEVELOPMENT

A. OBJECTIVE

A marked increase in the volume of foodstuffs and agricultural products - on the order of three to four times present regional production.

B. DESCRIPTION

Agriculture and rural development consists of the programs for making increasingly intensive use of irrigated lands, introducing higher yielding crop varieties, improved livestock, and the service-supporting activities, and improved health and education facilities for the rural population. The programs to bring about these conditions have been initiated. Advancement depends on research. Appropriate forms of research will provide a systematic procedure to get the answers needed for agriculture to achieve its objective, first in the 431,000 acres of the Upper Helmand, and later in the Lower Helmand consisting of 250,000 acres.

But techniques developed from research, alone, are not enough. They must be intelligently combined with an imaginative program of implementation, extending to all areas. Agricultural and rural development is as dependent on how effectively people work together as it is on the natural resources they work with.

The following programs seem to have the best potential and, in the case of research, illustrate the kind of information needed to bring about a high producing intensive agriculture:

1. Crops and fruits

a. Wheat Dramatic results in yields of the imported Mexican dwarf varieties of wheat have been demonstrated on large numbers of farms in the neighboring countries of Pakistan and India. Several of these new seed varieties are now included in trials in the Helmand region. Because of the adaptability of these new varieties to a wide range of climatic conditions, there is every reason to believe they will be equally productive here and will be in demand by farmers. A regional yield of 60 bushels per acre, versus the current yield of 18 should be attainable within 10 years. (Bushel is equal to 60 pounds.)

b. Cotton Cotton grows well in the region. A cotton gin has operated for four seasons, and a cotton seed oil mill will be commissioned later this year. Studies should be undertaken to improve both quality and yields, which have both declined during the last two years, and also to find ways to increase total production. The oil mill will require 20,000 tons of seed per year. Objective should be to reach 10,000 tons by the end of 5 years and 20,000 tons within 10 years.

c. Corn Corn is an important second crop, generally planted in the 2-year rotation immediately after wheat, enabling more intensive use of cultivated land. One locally developed improved variety has been introduced and fertilized demonstrations in the region last year indicated yields were about triple the local variety. Farmers have serious criticisms including too long a growing season. This year new tests will be undertaken to find a short-seasoned, open-pollinated high yielding variety more suitable for Helmand region conditions.

New synthetics that have proven well in tests at high altitude stations in India and Pakistan will be included. The target is to increase corn yields to 50 bushels per acre.

d. Fruits Grapes, pomegranates and apricots grow extremely well in the region. Both fresh and dried fruits are exported and earn considerable foreign exchange. A modern canning factory exists in Kandahar. However this requires expert assistance both in problems of processing and in developing better varieties more suitable for canning.

2. Livestock and Poultry

A modern pasteurization plant with a capacity of 2,900 pounds of fresh milk per day is now in operation. Plant production, however, is only 300 pounds per day. A ready market for milk and dairy products exists in all the larger urban areas of Afghanistan. In order to produce enough milk on farms to bring the plant to full capacity, herds need improving through the greater use of crossbreds accompanied by castration of local bulls, and further research on feeding, milk production, disease control and sanitation. Studies should be initiated in poultry to find the best combination of practices needed to produce eggs and poultry meat, and to assist farmers and commercial growers. Multi-purpose sheep health centers are needed to serve local farmers and nomad sheep herders. Livestock and poultry programs will emphasize production on farms.

3. Improved hand tools, field implements and simple tractor mechanization

The whole field of tools, implements and mechanization requires a thorough investigation. The shortage of labor, combined with antiquated hand tools and inefficient field implements, does not allow farmers enough time to harvest one crop and properly prepare the soil and plant the next crop. Yet, this is essential for the double-cropping pattern of intensive irrigated farming. Because of the small size of most land holdings, large scale mechanization as found in the Western world probably will not have a place here, except perhaps at research stations, seed multiplication farms, and on a few privately owned large farms. In the Shamalon area, for example, 36 farms studied had an average of 12 acres. The Bureau of Reclamation feasibility study suggests 25 to 30 acres as the economic size of future farm units. It is doubtful if farms of this size can effectively use tractors larger than 15 horsepower.

Japan has been most successful in developing mechanized equipment using tractors of less than 15 horsepower, and their equipment has been successfully adapted to numerous Asian countries with conditions similar to Afghanistan's. These tractors are low cost and simple to operate, yet rugged, and can plow and cultivate up to 5 acres a day, as well as perform other important functions such as mowing, spraying and transportation. Sound farming on farm units of less than 20 acres in size has been developed in several other countries using this simpler form of mechanization.

Selected models of promising designs of foreign tractors and related equipment -- of the Japanese type -- should be imported and tested under Helmand conditions and adapted where necessary. Not until they have been thoroughly tested and functional procedures worked out should they be introduced to farmers, and then only when accompanied by a closely supervised training and maintenance program, backed by continued spare parts and service facilities.

At the same time, foreign and local models of hand tools and animal drawn implements should be improved, and if acceptable to farmers, manufactured and marketed in the region.

Mules are superior, faster animals for farm work than bullocks, as now commonly used throughout the region for plowing. Since mules are already being produced in the region, they should be tried out for farm work and acceptance by farmers. Also, it is reported there is a surplus of camels in the region, due to their displacement from the economy by new highways and motor trucks, and they may offer an alternate source of improved farm power.

As rural electric lines are extended, study and adaptation of electrically-powered equipment and home appliances will likewise be required, and as rural development progresses, other farm problems of an engineering nature will require investigative and development type research.

4. Fertilizers and pesticides

In addition to initial fertility restoration required on some land to build up plant nutrients depleted from centuries of constant cropping, the new crop varieties require large dosages of fertilizer in the Helmand region. The types of fertilizer to use, when to apply and in what amounts for different crops and soils, are typical of the kinds of information needed. Further information will be required on the control of insect pests and diseases -- what chemicals, when to apply, and how much -- under our conditions.

5. Commercial crops

a. Sugar beets Sugar beets, if suitable to this region, offer interesting possibilities. The sugar would find a ready domestic market, saving on foreign exchange, and the pulp by-product could be used for livestock feed. A 20,000 ton sugar beet mill has been proposed for the third five-year plan, but before erection at least 3 or 4 years of tests should be conducted to answer such unknowns as production and yields, cultural practices, disease and insect control, sugar content, and the and planning if the organizations are to be effective.

Land development plans include enough roads to permit access to all farms by vehicular traffic. Village community centers will be erected at convenient intervals throughout the rural areas to provide offices for administrators and space for farm credit, a centralized tool and implement shop, schools, health facilities, farmer organizations, and extension leaders. Thus agricultural development and general social development will be closely integrated. Studies will need to be made in planning for and making effective utilization of these facilities.

8. Marginal lands

Marginal lands in the Upper Helmand total 131,000 acres that are not suitable for intensive agriculture. These will require studies to establish the most economic use for the land, and to outline steps for reclaiming where appropriate.

9. Extension

Closely allied to research is the agricultural extension program with the function of getting widespread adoption by farmers of improved farm practices through demonstration and practical assistance. A further major development will be the growing emphasis on education for rural youth and public health measures to develop and improve the living standard of people throughout the rural areas.

10. West Shamalon

These programs need to be started now. The next two or three years are crucial, for this is the period in which agricultural patterns are set, the initial package of proven practices are made ready, and the staff hired and trained to carry out the programs. First use of the new inputs will be in the West Shamalon pilot area (13,310 acres), after land improvements are completed economics of production. Assuming yields of 10 tons per acre, 13,400 acres would be required to supply a mill with 134,000 tons of sugar beets having 15% sugar content.

b. Others Sunflowers, kenaf, guar and many other commercial crops will require exploring as time goes on and before launching plants and mills to process these crops.

6. Credit and marketing

Modern, intensive agriculture depends on the supply of a vast number of inputs that must be available at the right time so the farmer can use them. As development progresses and agricultural production increases, farmers market a larger portion of what they produce. The storage, transportation and efficient distribution of farm produce is important to continuing growth.

To enable the farmer to adopt new practices and benefit from the knowledge gained from research, it is essential that he have the means to acquire the necessary new inputs such as improved seed, insecticides, fertilizers, tools and implements. In addition to a convenient source of supply, there must be provision for credit at reasonable interest rates. Banking facilities must be provided, with branches or representatives located conveniently for the farmers, perhaps through farm or community associations.

7. Rural development

Farmer organizations permit group actions in an organized manner to meet needs that many of them recognize but cannot meet by acting alone. These organizations have many uses for cooperatively solving common problems. Warehousing, furnishing of information and centralized purchasing of supplies are some of the benefits offered by farm organizations. However, this subject needs study and the tract is resettled -- perhaps two or three years hence. A concerted effort will be made to transform this tract into a model demonstration area -- a "show case" -- proving under actual farming conditions how improved varieties, fertilizer, mechanization and other inputs can increase agricultural production.

C. SPECIAL PROBLEMS

A problem of major proportion in bringing about the desired progress in agriculture and rural development is to assemble and train the village leaders required to carry out these programs.

D. RELATIONSHIP TO OVERALL DEVELOPMENT

Many people of Afghanistan suffer from malnutrition because the country is not self-sufficient in food. Yet theoretically, the basic physical resources are ample. In the Helmand region there are upwards of three-fourths of a million acres of irrigable land which, under long-range plans could be developed into highly productive agriculture. While modern agriculture is a highly capitalized endeavor, properly organized and operated, these lands could produce all the food needed to meet national requirements, with an excess for export -- and at the same time amortize the investment. Further secondary benefits would prove economically valuable in providing fibers, roots, animal skins, timbers and other raw materials needed in a growing industrial economy.

E. COSTS

Anticipated requirements in agriculture and rural development will cost $500,000 per year on a continuing basis, of which two-thirds could be supplied in local currency, exclusive of electrification and cottage industries.

SECTION IV

INDUSTRIAL DEVELOPMENT

A. OBJECTIVE

To develop industries which will aid in capital formation and add to the wealth of Afghanistan, provide a source of foreign exchange and furnish increased employment opportunities.

B. DESCRIPTION

First priority in industrial development is being given to industries related to agriculture, such as processing of agricultural products or manufacturing products needed in the development of agriculture. Within this group high priority will be given to the manufacture of commercial fertilizers which are so vital to increased agricultural production. Lack of suitable raw materials and adequate cheap power has held back the start of this industry.

The completion of the Kajakai power project, planned for the Third Five Year Plan, will give a great impetus to the entire industrial development program. During the early phase, pending the availability of this power, much of the effort of HAVA will be devoted to research to determine the most suitable crops for processing and to study and evaluate available resources and markets.

In this earlier phase it is recognized that many other preparatory steps are necessary to insure the success of the planned industries. An adequate labor force concentrated in the industrial areas requires city planning to provide the increased housing, schools and health facilities. In addition to power, there must be provision for an ample supply of good water for the increased population as well as the great quantities needed in many manufacturing processes. A modern sewage system to dispose of industrial wastes and an expanded transportation system,--all of these are as essential to industrial development as the factories themselves.

SECTION I

GENERAL

A. INTRODUCTION

1. **Purpose** The purpose of this paper is to provide His Excellency, the Prime Minister, with facts concerning the background, current status and future potential of the Helmand Arghandab region for his use during discussions in Washington.

2. **Format** The presentation will consist of eleven sections covering all aspects of a long range Helmand Arghandab regional development program. Section I will give a brief overview of the project as a whole. This General section will be followed by more detailed discussions on particular phases of the program, with specific recommendations where pertinent.

B. BACKGROUND

For many generations Afghans have dreamed of controlling the Helmand River and returning its valley to the richness it enjoyed centuries ago, before human and natural enemies reduced it to desert and desolation.

Some thirty years ago in the 1930's the Royal Government of Afghanistan (RGA) employed a team of Japanese engineers to rehabilitate and improve the old canal systems which had functioned for over 200 years. With the entrance of Japan into World War II these foreign engineers left the country and work was continued under Afghan supervision, using hand labor almost entirely. After World War II the RGA employed Morrison-Knudsen Afghanistan, Inc., an American engineering and construction company, relying on its own financial resources initially. These resources were later supplemented by two loans from the Export-Import Bank in 1950 and 1954, amounting to a total of $39,300,000. The RGA has continued to make advances to project construction from its own funds since 1946 and, in addition, since 1954 has received financial assistance from USAID in the form

Financing such a program will require a bank or banks in the Helmand area, amply capitalized to provide the necessary credit for industrial and agricultural development. Although the investment of private capital will be encouraged, it is realized that large initial outlays by the government will be required.

Several units have recently been separated from the HAVA organization and chartered as enterprises. Although they are wholly owned by the government at this stage, the object is to organize and build them to a point where they will be attractive for purchase by private investment capital. An alabaster processing plant, a cotton gin, a dairy, hotels, construction and building enterprises are now functioning in this manner. A modern oil seed processing mill is under construction to process cotton seed and other oil seeds. Research is proceeding to determine the economic feasibility of producing sugar beet, kenaf and other raw materials which would justify processing facilities.

Investigations are going ahead to determine other industries which are needed in the growing economy or which are most suitable to the conditions found in the Helmand Valley. Among those under consideration are the following: a wool scouring plant, a modern slaughter house, textile mills, insecticide manufacturing from geraniums, manufacturing of building materials such as roofing, clay tiles, bricks, as well as implements and tools. Service and craft industries will be encouraged in order to serve the expanding population of the industrial centers. In all cases the intention is to assist the new industries as necessary with government financing while at the same time encouraging private enterprise to take them over in the future.

C. SPECIAL PROBLEMS

Lack of technically trained personnel and people with managerial training and experience who are used to thinking in terms of profit incentive.

D. COSTS

Costs will be substantial in the initial stages but will eventually be amortized through profits or through sale to private investors. Original capital investments, particularly for machinery, will require a high percentage of foreign exchange financing. Urbanization of industrial centers to provide certain basic facilities such as water and sewage systems, housing and services for an expanding labor force are all covered as to cost in other sections of this paper.

SECTION V

ELECTRIC POWER

A. OBJECTIVE

To provide sufficient electric power to the Helmand-Arghandab Valley to meet industrial and domestic requirements, as well as provide power to irrigate higher bench lands through pumping stations.

B. DESCRIPTION

This project is centered in the proposed construction of 150,000 kw hydroelectric generating capacity in the Kajakai dam, and related transmission and distribution systems to serve the Helmand-Arghandab areas.

Installing this generator equipment has been part of the long range plan since inception of the dam itself. The tunnel to accommodate the hydroelectric equipment was built into the dam originally. Economic surveys have been made, and a loan study report was published in January 1967 by [illegible]. [illegible]. Beck and Associates of Seattle.

The project is planned to be accomplished in three phases:

Phase I is the construction and installation of two 16,500 kw each hydroelectric generating units, and related transmission system and personnel training program. The cost of this is estimated to be $16,600,000, and would require about five years for completion. The need is present and this work should be accomplished during the RGA third five-year plan.

Phase I also includes construction of gates to control the amount of water that goes through the spillway. Such control gates are required for three distinct reasons:

1. Flood control;
2. Raise level of reservoir to increase head of water for power;
3. Augment water supply.

The cost of this part of Phase I is about $3,000,000. There are sufficient funds budgeted in the HAVA third five-year plan to cover it.

Phase II is the addition of a third 16,500 kw unit, bringing the total capacity upon completion to 49,500 kw. Time: five years after completion of Phase I. Cost: estimated $2,000,000, plus $2,000,000 for distribution.

Phase III, for the ultimate use of this natural resource, four additional 25,000 kw each hydroelectric generating units, and related enlarging of the transmission and distribution systems, are planned. This would come at such a time as the load demand would justify the additions.

The scheduling and cost of this last phase is estimated as follows:

Two - 25,000 kw units ten years after completion of Phase II, cost $5,000,000, plus $5,000,000 for distribution

Two - 25,000 kw units twenty years after completion of Phases II, cost $5,000,000 plus $5,000,000 for distribution

Present capacity The present capacity of electric power in the Helmand-Arghandab Valley is:

Girishk	2 @	1,200 kw	hydro generators	2,400 kw
Bost	1 @	1,000 kw	diesel electric	1,000
Kandahar	2 @	500 kw	" "	1,000
	1 @	250 kw	" "	250
	1 @	260 kw	hydro-turbine	260
	2 @	320 kw	" "	640
				5,550 kw

This present capacity is entirely insufficient to meet the current demands in the area for electric power; furthermore, the plants have very meager and unreliable distribution systems.

Interim measures Two interim measures are now in progress to meet the demand for electricity until the Kajakai hydroelectric power becomes available. These measures are:

1. Rehabilitation and expansion of the existing distribution systems of Kandahar, Girishk and Bost;

2. Installation of 3,000 kw diesel generator equipment in the present Kandahar system.

C. SPECIAL PROBLEM

Lack of competent operating and management personnel.

D. RELATIONSHIP TO OVERALL ECONOMIC DEVELOPMENT

Developing sufficient electric power is an essential element to the economic development of the Helmand-Arghandab Valley.

E. COSTS

The total cost of ultimate completion of the 150,000 kw capacity is estimated at some $43,600,000. Of this, $31,000,000 is in the HAVA budget for the third five-year plan.

SECTION VI

PUBLIC WORKS

A. OBJECTIVE

To provide sufficient public roads, streets, and service facilities to the Helmand Valley to speed economic development.

B. DESCRIPTION

There are five major parts of the public works project:

1. Bost road Paving approximately fifty kilometers of gravel road linking Bost with the main Kabul-Kandahar-Herat Highway.

   Cost: $500,000. Priority: 1.

2. Bost streets Paving approximately twenty kilometers of gravel streets in the city of Bost.

   Cost: $350,000. Priority: 2.

3. Secondary roads Constructing all-weather roads in the following rural areas:

		Priority	Km	Cost
a.	Shoraw-Bost	3	50	$ 750,000
b.	Girishk-Musa Qala-Baghran	5	140	2,100,000
c.	Darweshan-Deshu	9	120	1,800,000
d.	Deshu-Chakhansur	11	250	4,750,000

4. Water and sewer systems New municipal water and sewer systems, including purification plants for use of river water:

		Priority	Cost
a.	Bost	4	$ 4,000,000
b.	Girishk	8	3,000,000
c.	Kandahar	6	20,000,000
d.	Water supply for rural villages	12	4,000,000

5. Air facilities Constructing runways with terminal and all-weather operating facilities:

		Priority	Cost
a.	Bost	7	$ 1,000,000
b.	Chakhansur	10	1,300,000

C. SPECIAL PROBLEMS

To train the people to realize that water is a precious commodity, and that it must be safeguarded, managed well, and kept clean.

D. RELATIONSHIP TO OVERALL DEVELOPMENT

Bost is the administrative headquarters of the HAVA. It is a growing industrial and commercial center of the Helmand Valley. Development of facilities in Bost, and connecting Bost with the surrounding areas, to accommodate the expanding population and to facilitate economic and social growth is essential to the overall development of the valley.

The construction of all-weather roads in the rural areas of the valley and making the Helmand River navigable, if proven feasible, are essential to get produce off the farms and into the population and processing centers, The economic and industrial growth of the region is dependent upon such vital supply lines.

E. COSTS

Total cost of this public works project is $43,550,000 Some $2,000,000 is in the HAVA third five-year plan budget. The HAVA recommends priority as shown with each item.

SECTION VII

EDUCATION

A. OBJECTIVE

To develop the human resources of the Helmand Valley by raising the level of literacy and training technically qualified personnel to carry on development.

B. DESCRIPTION

Effective assistance in the educational program is sorely needed throughout the Helmand Region, in order to overcome a high level of illiteracy and to improve the knowledge, understanding and culture of the people. With the substantial investment being made for developing agriculture, industry and power there will be a continuing and growing need for technically trained personnel.

The Education Department of the HAVA has set as its goals:

1. a village school for each 3,000 persons;
2. a primary school for each 7,000;
3. a secondary school for each 20,000;
4. an Agricultural and Mechanical college (grades 13 and 14);
5. to conduct adult literacy classes and evening classes in vocations;
6. to build and equip 24 multi-purpose community centers.

C. SPECIAL PROBLEMS

Lack of teachers and adequate facilities.

D. COSTS

Estimated costs for carrying out this program amount to $200,000 per year on a continuing basis, of which one-half would be local currency.

of both grants and loans. Total development expenditures from these three sources amount to approximately $100,000,000 to date. The RGA is grateful for the generous assistance of the United States and takes pride in the fact that payments against these loans have always been maintained up to date.

Prior to the RGA Second Five Year Plan the Kajakai dam on the Helmand River and the Arghandab dam northeast of Kandahar were constructed under this early program. In addition, the Boghra, Shamalon, Darweshan and South canals, along with a portion of the related structures, such as roads and drains, were also built under the contract with Morrison-Knudsen and by the Afghan Construction Unit of HAVA.

C. PRESENT STATUS

Today, with the completion of the two dams, a canal system and some drains, there exists the basic infrastructure of an irrigation system which potentially can serve 300,000 acres of land in the upper Helmand between Kajakai and the lower part of Darweshan. However, only a very small fraction of the potential can be realized until this land under water command can be fully developed. This will require completion of the distribution system and construction of adequate drainage as well as leveling and restoration of fertility of the land, all of which is necessary for proper utilization of the water and land resources now available.

The completion of this land development work was included in the Second Five Year Plan as a continuation of the RGA program and was discussed with the representatives of the United States in regard to financial and technical assistance. Much time was spent on meetings and discussions, from which the following agreement evolved.

1. Since the United States, bound by legislation enacted by its Congress, was not able to make loans or grants for capital improvement such as land development without proper feasibility studies, it was considered mandatory that such

SECTION VIII

PUBLIC HEALTH

A. OBJECTIVE

To bring high, modern standards of health and sanitation to all parts of the Helmand Region.

B. DESCRIPTION

The improvement of public health in the Helmand Region is not only an end objective in itself, but it is also a vital factor in all other objectives which involve people for full, successful accomplishment. Villages throughout the region completely lack modern facilities for sanitation, prevention of disease or care of the sick. A new hospital in Bost, completed in 1964 with USAID help, provides a medical center for the Helmand province and a nucleus upon which to build.

Planning for the next five years concentrates on:

1. Improving the facilities and personnel at the central Bost Hospital;
2. Equipping and manning clinics and dispensaries in the rural area;
3. Providing vehicles, particularly mobile clinics, to service remote areas.
4. Modest programs in tuberculosis control, maternity and child welfare, anti-trachoma, vaccination and general sanitation.
5. Providing sanitary domestic water supplies and orderly sewage disposal.

Longer range planning calls for a continuation and augmentation of these programs.

C. SPECIAL PROBLEMS

Except in Bost, only the most primative facilities exist and there is little or no understanding of the need for sanitation, cleanliness or disease prevention. There is a critical shortage of medical personnel and technicians.

D. COSTS

Estimated costs are $100,000 per year for the life of the program, of which one-half would be provided in local currency.

SECTION IX

HELMAND VALLEY FLOOD CONTROL

A. OBJECTIVE

To eliminate the destruction of lives and property and the loss of valuable top soils caused by seasonal flooding of the Helmand River and its tributaries and to augment the water supply for the valley.

B. DESCRIPTION

Destructive flooding in the Helmand watershed has been controlled to some extent by construction of the Kajakai and Afghandab dams. Controlled release of water stored in their reservoirs has done much to reduce the extreme damage caused each year by the spring rains and snow melt in the mountains to the north. However, the heavy run-off which reaches the Helmand from the many tributaries below the two dams lacks any means of control.

Many of these tributaries, which are dusty dry washes most of the year, become raging torrents as they collect the spring run-off from the mountains and funnel it into the Helmand. The Moosa Qala, fed from the mountains near Nawzod, and the Sangin wash carrying the spring runoff from the mountains to the east, both join the Helmand below the control of the Kajakai reservoir. In addition to the damage in their own areas, their cumulative effect in the Helmand threatens each year to cause disastrous damage to the great investment in the Helmand irrigation system.

Although no detailed surveys or cost estimates are available, it is obvious that properly placed flood control structures and levees in these two major tributaries would not only prevent the annual flood destruction, but would contribute to a more evenly distributed supply of irrigation water in these two areas.

Raising the spillway at Kajakai by 11.5 meters and providing spillway gates would approximately double the reservoir capacity and would aid greatly in flood control. This improvement is included in the Third Five Year Plan under the Kajakai power project at an estimated cost of $3,000,000.

Below Darweshan the Helmand, Farah and Khosh Rivers all add seasonal destruction to the once fertile Chakhansur area. A reconnaissance survey by the International Engineering Company in 1955 indicated that reasonable protection of the presently cultivated areas could be afforded by two diversion dams and a control weir about 40 kilometers upstream from the proposed irrigation system near Khuabgah. Estimated cost for this project in 1955 was $6,000,000. Allowing for increased construction costs it is now estimated at $8,000,000. An essential, closely related project is construction of a road from Darweshan to Chakhansur, included in the Lower Helmand Development. Dams and related control works in the Farah and Khosh Rivers, which feed into the Lower Helmand, are estimated to cost $14,000,000 and $8,000,000, respectively.

C. SPECIAL PROBLEMS

There appear to be no special problems not found in any similar flood control situation.

D. COSTS

Although no detailed engineering studies have been made upon which to base accurate cost estimates, it is believed for planning purposes that the following represent an approximate cost of providing effective flood control to the Upper and Lower Helmand Valley.

1.	Kajakai spillway gates (Part of Kajakai Power Project)	$ 3,000,000
2.	Lower Helmand flood diversion dams and control weir (included under Lower Helmand Development)	8,000,000
3.	Moosa Qala dam and control works	14,000,000
4.	Farah dam and control works	14,000,000
5.	Sangin detention dam	2,000,000
6.	Khosh dam and control works	8,000,000
	Total	$49,000,000

The total estimated cost for the six projects outlined, which would give effective flood control of the Upper and Lower Helmand, would be $49,000,000. Seventy percent of these costs would require hard currency, while the balance would be in Afghanis.

E. RECOMMENDATIONS

1. The HAVA recommends that the Kajakai spillway gates and the Lower Helmand flood diversion dams and control weir be programmed in the Third Five Year Plan at an estimated cost of $3,000,000 and $8,000,000 respectively.

2. It is further recommended that the Moosa Qala and Farah River dams and control works be programmed in the Fourth Five Year Plan at an estimated cost of $14,000,000 each.

3. The Khosh dam and control works and the Sangin detention dam are recommended for programming in the Fifth or subsequent Five Year Plans, as the situation and availability of funds indicate.

SECTION X

LOWER HELMAND DEVELOPMENT

A. OBJECTIVE

To increase the productivity of lands now under cultivation in the Lower Helmand Valley and to develop new, unused lands in that area for productive use.

B. DESCRIPTION

The Chakhansur area of the Lower Helmand Valley contains several hundreds of thousands of acres of land that potentially can be developed to variable degrees of productivity. Because of special problems and substantial costs involved this would be a lower priority project in comparison to the Upper Helmand and areas that are now under command of water.

In December, 1955, a report on this area was prepared by the International Engineering Company, Inc., for H.V.A. The report is based on a brief reconnaissance survey and will have to be supplemented by more detailed studies and tests of physical and economic feasibility. However, it forms a basis for preliminary planning.

Three stages in the development appear to be indicated.

First Stage About 40,000 acres are presently cultivated by approximately 8,000 families. Although hard working people, the deterioration of the land has made it increasingly difficult to make a living. A logical first stage would be to improve this part of the area and help these people regain their earlier standard of living. This would involve:

1. Construct a road from Darweshan to Chakhansur to provide access to the area and an outlet for products;

2. Construct a permanent diversion dam and control works. A location 20 kilometers upstream from Khuabgah has been suggested.

3. Design an overall canal system, giving priority of construction to serving the lands now under cultivation.

4. Conduct a training program to educate the people in proper use of water, drainage, crop rotation, soil erosion prevention, etc.

Costs are estimated at $10,000,000 for the above.

Concurrently with this first stage of land development it is highly desirable that a flood control structure be completed in order to prevent the possible loss of the irrigation system by flooding. Preliminary studies indicate the need for two diversion dams and a control weir about 49 Kms. upstream from the proposed irrigation diversion. This would divert the flood waters to the Gaud-i-Zirreh wasteland, where evaporation would take place.

The cost of the flood control is estimated at $6,000,000.

Intermediate Stage There are about 85,000 acres of the best remaining land which should be considered for development in this second stage, which would include the following:

1. Expand the canal and drainage design and construction for the 85,000 acres.

2. Soil reclamation and restoration.

3. Continue erosion control.

4. Study potential of other stream tributaries.

5. Continue educational program.

Estimated costs of this stage are placed at up to $500 per acre or $42,500,000.

Ultimate Stage From the reconnaissance it appears that there may be about 125,000 acres which could be developed at a cost of up to $1,000 per acre, a total of $125,000,000.

C. SPECIAL PROBLEMS

This area presents many physical hazards to a development program.

1. Possibility of flooding. There is a history of frequent serious floods. This situation is helped in recent years by flood control which now exists in the Upper Helmand Valley.
2. High winds that damage crops, cause drifting sand dunes and extensive soil erosion.
3. Lack of drainage.
4. Lack of roads.

D. COSTS

Costs of carrying out the three stages of development on a total of 250,000 acres were estimated at $183,000,000 over an extended period of time,-- perhaps up to 25 years. These costs were estimated on the basis of 1955 figures, at the time of the reconnaissance. Increased salary scales and material costs since that time would make a more realistic estimate of $20,000,000 for the first stage, instead of $16,000,000. Escalation of construction costs in the future would make a more realistic total cost in the neighborhood of $200,000,000. About 70% of these costs would require hard currency, with the balance in Afghanis.

E. RECOMMENDATIONS

1. The HAVA recommends that the first stage of the Lower Helmand Development be included in the Third Five Year Plan, with the following priority:

a. Construct road from Darweshan to Chakhansur.

b. Design and construct flood control structure consisting of two diversion dams and a control weir about 40 Kms. upstream from the proposed irrigation diversion.

c. Construct diversion dam and control works 20 Kms. upstream from Khuabgah.

d. Design an overall canal system, with priority of construction to serve lands now under cultivation.

e. Conduct a training program in the proper use of water, drainage, crop rotation, soil erosion control, etc.

2. It is further recommended that the Intermediate and Ultimate Stages be programmed for the Fourth and subsequent Five Year Plans as conditions and the availability of funds indicate.

SECTION XI

RECAPITULATION OF COSTS

A. LAND DEVELOPMENT--UPPER HELMAND

1.	Marja and Nad-i-Ali	$ 2,000,000	
2.	130,000 acres @ $300	39,000,000	
3.	130,000 acres @ $100	13,000,000	
4.	Seraj canal	1,500,000	
5.	Arghandab water supplement	8,000,000	
	Total		$ 63,500,000

(About 70% hard currency would be required and the balance in Afghanis)

B. AGRICULTURE AND RURAL DEVELOPMENT

Yearly cost on a continuing basis will be $500,000.

C. INDUSTRIAL DEVELOPMENT

Substantial initial costs will be amortized from profits or by sale of enterprises to private investors.

D. ELECTRIC POWER

1.	Phase I	$16,600,000	
	Kajakai spillway gates (included in flood control)	3,000,000	
2.	Phase II	4,000,000	
3.	Phase III	20,000,000	
	Total for ultimate capacity of 150,000 kw, including distribution		$ 43,600,000

preinvestment surveys be made for development of land now under command of water. The Bureau of Reclamation was given the task, to be financed from grant funds and completed at the rate of 20,000 acres per year.

2. Since most of the land in the Arghandab area had gone bad and water-logged for lack of drainage, an immediate rescue operation for this distressed area was to be undertaken.

   This idea has been abandoned in favor of overall development of the land pending the findings of feasibility studies.

3. In order to continue the work in the Shamalon and Darweshan areas until more loan funds were available on the basis of feasibility studies, it was also agreed that an interim loan, known as the ACU Equipment Loan, would be made available for the purpose of tooling up the ACU and keeping the land development program going.

4. Phase I of the Kajakai power development, which was also a part of the agreement, included the installation of three 16,500 KW generators, transmission lines to Kandahar and Girishk, and the substructure for the remaining 100,000 KW capacity planned for later installation.

Progress on implementation of these agreements is presently as follows:

1. A team from the U. S. Bureau of Reclamation has been on the project for two years for the purpose of making feasibility studies to determine which land it is economically feasible to develop. They have recently completed a draft of their first comprehensive report covering the West Shamalon area, consisting of 13,310 acres, or approximately one-third of the Shamalon area. In addition, they have done land classification only on the rest of the Shamalon and a small part of Darweshan. (Feasibility studies involve land classification, drainage studies, topography, water supply and economics.)

E. PUBLIC WORKS

1.	Bost road	$ 500,000	
2.	Bost streets	350,000	
3.	Secondary roads:		
a.	Shoraw-Bost	$ 750,000	
b.	Girishk-Moosa Qala-Baghran	2,100,000	
c.	Darweshan-Deshu	1,800,000	
d.	Deshu-Chakhansur	4,750,000	
	Total		$10,250,000
4.	Water & Sewage Systems		
a.	Bost	$ 4,000,000	
b.	Girishk	3,000,000	
c.	Kandahar	20,000,000	
d.	Rural villages	4,000,000	
	Total		$31,000,000
5.	Air Facilities		
a.	Bost	1,000,000	
b.	Chakhansur	1,300,000	
	Total		$ 2,300,000

F. EDUCATION

Yearly costs on a continuing basis	$ 200,000

G. PUBLIC HEALTH

Yearly costs on a continuing basis	$ 100,000

H. HELMAND VALLEY FLOOD CONTROL

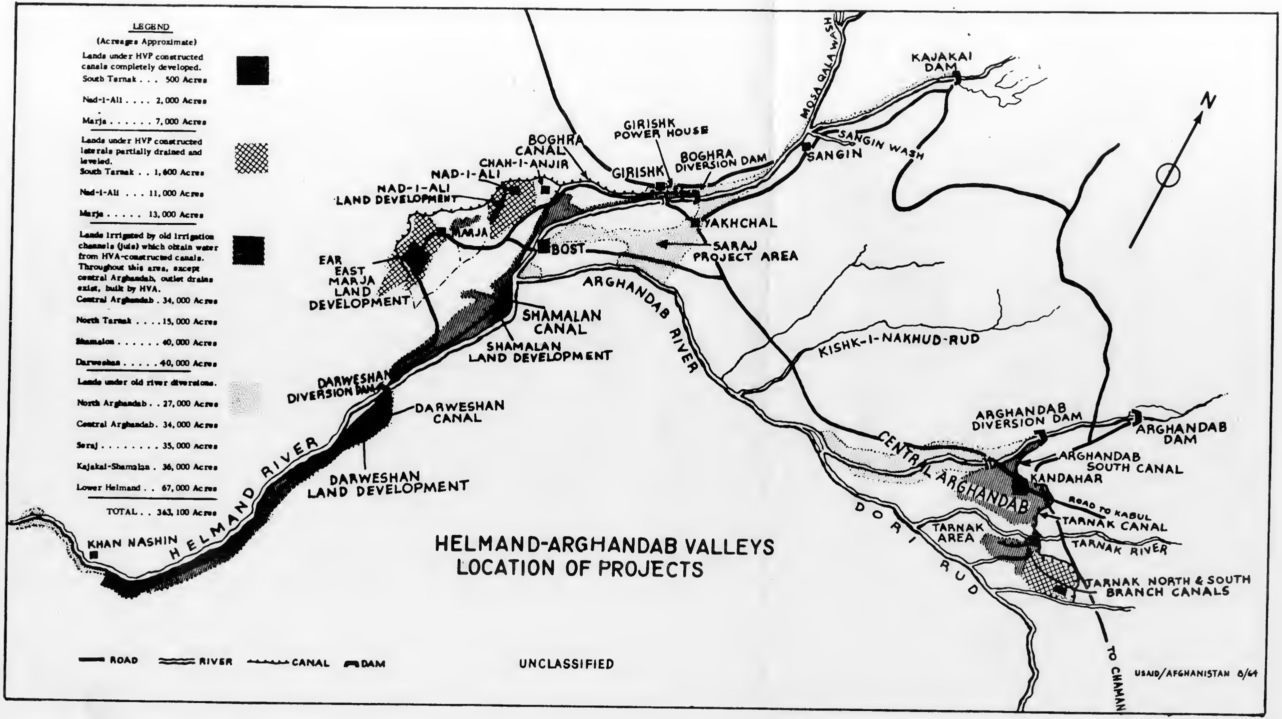
1.	Kajakai spillway gates (Included in Kajakai power)	$ 3,000,000	
2.	Lower Helmand Flood Diversion (Included in Lower Helmand Development)	8,000,000	
3.	Moosa Qala dam & control works	14,000,000	
4.	Farah dam & control works	14,000,000	
5.	Sangin detention dam	2,000,000	
6.	Khosh dam & control works	8,000,000	
	Total		$ 49,000,000

(Approximately 70% will be hard currency and the balance in Afghanis)

I. LOWER HELMAND DEVELOPMENT

1.	Stage I	$ 20,000,000	
2.	Intermediate stage	42,500,000	
3.	Ultimate stage	125,000,000	
		$187,500,000	
	Allowance for escalation of costs	12,500,000	
	Total		$200,000,000

(Approximately 70% will be hard currency and the balance in Afghanis)



HELMAND-ARGHANDAB VALLEYS
LOCATION OF PROJECTS

LEGEND
(Acreages Approximate)
Lands under HVP constructed canals completely developed.
South Tarnak . . . 500 Acres
Nad-i-Ali . . . . 2,000 Acres
Marja . . . . . . 7,000 Acres
Lands under HVP constructed laterals partially drained and leveled.
South Tarnak . . 1,600 Acres
Nad-i-Ali . . . 11,000 Acres
Marja . . . . . 13,000 Acres
Lands irrigated by old irrigation channels (juis) which obtain water from HVA-constructed canals. Throughout this area, except central Arghandab, outlet drains exist, built by HVA.
Central Arghandab . 34,000 Acres
North Tarnak . . . . 15,000 Acres
Shamalon . . . . . . 40,000 Acres
Darweshan . . . . . 40,000 Acres
Lands under old river diversions.
North Arghandab . . 27,000 Acres
Central Arghandab. 34,000 Acres
Seraj . . . . 35,000 Acres
Kajakai-Shamalan . 36,000 Acres
Lower Helmand . . 67,000 Acres
TOTAL . . 363,100 Acres
KAJAKAI DAM
MOSA QALA WASH
SANGIN WASH
SANGIN
N
GIRISHK POWER HOUSE
BOGHRA CANAL
BOGHRA DIVERSION DAM
GIRISHK
CHAH-I-ANJIR
NAD-I-ALI
NAD-I-ALI LAND DEVELOPMENT
MARJA
YAKHCHAL
BOST
SARAJ PROJECT AREA
EAR EAST MARJA LAND DEVELOPMENT
ARGHANDAB RIVER
SHAMALAN CANAL
SHAMALAN LAND DEVELOPMENT
KISHK-I-NAKHUD-RUD
DARWESHAN DIVERSION DAM
DARWESHAN CANAL
DARWESHAN LAND DEVELOPMENT
HELMAND RIVER
KHAN NASHIN
ARGHANDAB DIVERSION DAM
ARGHANDAB DAM
ARGHANDAB SOUTH CANAL
CENTRAL ARGHANDAB
KANDAHAR
ROAD TO KABUL
TARNAK CANAL
TARNAK AREA
TARNAK RIVER
DORI RUD
TARNAK NORTH & SOUTH BRANCH CANALS
TO CHAMAN
ROAD
RIVER
CANAL
DAM

UNCLASSIFIED

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2. The Bureau of Reclamation recently has started with feasibility studies in the Arghandab area.

3. The equipment loan is still under consideration in Washington.

4. Kajakai power, with only two 16,500 KW generators, is under consideration in Washington now.

As can be seen from the above, the progress has been negligible and the goals set up in the Second Five Year Plan have not been attained, nor even closely approached. This lack of progress is very discouraging and, if continued, will have an unfortunate and far reaching effect.

From its inception in 1953, the Helmand Arghandab Valley Authority has been chartered by the RGA as an autonomous regional organization charged with responsibility for overall regional development in the entire Helmand-Arghandab water shed, which overlaps several provinces. Its responsibilities go well beyond irrigation and land development and include all aspects such as agriculture, education, public health, industry and power.

Now that a more stable supply of water is available the HAVA is putting stronger and stronger emphasis on improved agricultural methods and increased production, particularly of food and fiber products. An intensive research effort and a seed multiplication program have been started this year. By this greater concentration on increased yields it is hoped to speed the day when Afghanistan can be self-sufficient in its food needs.

In the fields of industry a number of activities have been separated from the HAVA organization during the past year and chartered as autonomous enterprises. Although now wholly government owned, they are being organized and built up to make them attractive for sale to private investors.

The HAVA is also supplementing the activities of the Ministry of Health and the Ministry of Education in the project area in order to develop the manpower which will be needed to carry on further development of the area.

Thanks to the help of our American friends who have been so closely identified with the progress to date, we feel that we have now reached a point where further cooperative effort will begin to show increasingly dramatic, tangible results.

D. FUTURE POTENTIAL

In the preparation of this paper the HAVA has attempted to project its thinking into the long range future. To plan intelligently for the more immediate future requires that we look far ahead and consider our ultimate goals, in order that our short term efforts can fit a logical pattern and not be short-sighted and wasteful.

Since the Helmand Arghandab Valley contains such a high percentage of the arable land in Afghanistan, its productivity and the welfare of its people will become increasingly important with the growth of population. The more detailed sections covering specific aspects of the development program were prepared with these thoughts in mind.

E. ADMINISTRATION

To realize the full potential of the Helmand Arghandab Valley and to reap the benefits which can come to Afghanistan from its full development will require a maximum, sustained effort on the part of all associated with the project. This effort, in turn, can be effective only if properly directed and administered.

Enlightened management policies and effective administrative procedures will be essential to the successful development of the natural and human resources of the area. These same factors will be equally essential in the day to day operations and maintenance of the gains and accomplishments resulting from successful development.

Traditional procedures and attitudes which hinder accomplishment must give way to more enlightened, modern procedures and attitudes. Restrictive rules, regulations and customs must be changed to permit progress and accomplishment, while still maintaining reasonable controls and safeguards. And personnel policies must be instituted which will bring results and efficient accomplishment by well motivated and well trained employees.

Where antiquated rules or regulations restrict operations and allow no discretion to liberalize them, there should be effective machinery for liaison with the ministries concerned. In this connection, the Management Improvement Institute now under consideration in the office of the Prime Minister appears to offer an ideal clearing house for this purpose. The HAVA would welcome the help that such an activity could render and strongly endorses the adoption of this idea and the early establishment of the Institute.

F. GENERAL RECOMMENDATIONS

1. It is recommended that the idea of having land development done by a foreign contractor augmenting HACU's capability be explored and favorably considered. Experience in the past with construction of irrigation systems and roads in Afghanistan indicates that this could prove to be the most expeditious and economical method, as well as the most successful way to train and build know-how of Afghan personnel.

2. It is further recommended that the rate of completion of feasibility studies be increased substantially by either augmentation of the Bureau of Reclamation Planning Team or by private contract. Since feasibility reports take considerable time and are required in advance of land development loans, the HAVA feels it important to avoid the possibility of future delays when land development gets going in full gear.

3. Feasibility studies and reports do not include design or preparation of specifications, which could logically be done concurrently with the studies. It is therefore recommended that this task be given to an engineering contractor or made the responsibility of the Bureau of Reclamation team for accomplishment along with the closely related work required in the studies.

SECTION II

LAND DEVELOPMENT - UPPER HELMAND

A. OBJECTIVE

To complete land development work on the 300,000 acres of Upper Helmand land now under the command of water, and to prepare it for maximum production.

B. DESCRIPTION

Land development includes construction of an irrigation distribution system, a drainage system and a network of access roads as well as the land leveling, restoration of fertility and initial preparation of the seed bed for crops. Only when all phases of this work are completed can the full benefits of the basic infrastructure be realized and the early investment begin to pay off.

In the case of the Upper Helmand an investment of $100,000,000 to date has provided the basic infrastructure to place 300,000 acres under water command. Two dams, a canal system and some drains were completed under the Morrison-Knudsen contract which terminated in 1959. Since that time, with the exception of some work by ACU, the improvement of the land to make effective use of the now stable supply of irrigation water has stagnated. Until this follow-up program can be moved along and a substantial percentage of the 300,000 acres fully developed no agricultural program, no matter how well planned, will be able to achieve the high yields and double cropping necessary to an improved standard of living. On the other hand, completion of this land development program will enable the Upper Helmand Region to contribute substantially to making Afghanistan self-sufficient in its food needs.

For the purposes of this paper the Upper Helmand is defined as the area along the Helmand and Arghandab Rivers extending downstream from the two dams to the southern end of Darweshan. It includes the following principal areas:

1. Shamalon The Shamalon area lies along the west side of the Helmand below Bost and is expected to have about 39,000 acres of feasibility grade land. Studies have been completed by the Bureau of Reclamation on 13,310 acres of this area and the first draft feasibility report published in December, 1966 indicates technical and economic feasibility warranting full development. Reports on the remaining acreage will be completed in 1967.

   Construction and land leveling on the 13,310 acres can begin as soon as a satisfactory solution has been reached on social, political and economic issues associated with the temporary displacement of land owners during construction. Once started, it is estimated that two years would be required to complete the 13,310 acre tract, after which agricultural and rural development programs could get into full swing.

2. Darweshan This area is on the east bank of the Helmand River, south of the Shamalon and consists of 40,000 acres. Construction should be done simultaneously with the Shamalon and Arghandab. Plans call for the main canal to be extended 25 kilometers, with total development of the farm land.

3. Nad-i-Ali and Marja These two areas, characterized as desert land, total 39,000 acres and have received the most complete development of any area in the project. However, lack of adequate drainage facilities and a rising water table have resulted in salinization in parts of Nad-i-Ali. Because of this agricultural production has been disappointing. A detailed, definitive study is needed to determine the best use of these lands, and to outline the steps required to rehabilitate the areas for more productive use. Preliminary estimates for this rescue operation place the cost at about $2,000,000.

4. The Seraj area of about 30,000 acres and the area below Kajakai of about the same acreage are both served by old, traditional irrigation systems which have benefited to some degree from the more stable water supply in the river. There is urgent need for rehabilitation of the Seraj canal, which is 65 kilometers long and serves land which is potentially productive. A canal bank road for maintenance purposes, water delivery control structures, as well as intake and other appurtenance structures are needed. Preliminary estimates place the cost at $1,500,000.

5. Arghandab The Arghandab River is a main tributary of the Helmand which is of major importance because of its close proximity to the marketing area of Kandahar, the second largest city in the country, where a modern fruit packing plant, woollen mills and other facilities offer an outlet for its agricultural products. Geographically the Arghandab area is also important because of the Kandahar International Airport and the nearby Pakistan border, which serves as a vital gateway for export of products of the area.

   This general area consists of the Central Arghandab (60,000 acres), the North Arghandab (25,000 acres) and the Tarnac (36,000 acres), which are all supplied from the Arghandab reservoir. Unfortunately, waterlogging has occurred and many of the orchards and vinyards which provide the exportable products are dying out. An urgent rescue operation to prevent further deterioration makes this land development program one of top priority, along with the Shamalon. The Bureau of Reclamation has already completed aerial photography and some preliminary investigation work in the area.

   While the Arghandab reservoir has added substantially to the water supply, it will still be necessary to seek supplementary sources to augment the supply. This can be achieved through

AN OVERALL REVIEW
# of the
HELMAND ARGHANDAB VALLEY DEVELOPMENT

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The Helmand Arghandab Valley Authority
Bost, Afghanistan

March, 1967

AN OVERALL REVIEW

# of the

HELMAND ARGHANDAB VALLEY DEVELOPMENT

prepared for
His Excellency, Mohammad Hashim Maiwandwal
Prime Minister

by

The Helmand Arghandab Valley Authority
Mohammad Hashim Safi
General President

March 1967

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